

09/555350

526 Rec'd PCT/PTO

26 MAY 2000

**VERIFICATION OF TRANSLATION**

I, *Dr. Sabine Riemann,*  
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confirm that I am fully conversant with the German and English languages and I state that the following is a true translation of the best of my knowledge and belief.

*- Sequence listing as amended and filed with the European Patent Office on April 22, 1999 - for:*  
*U.S. application, based on:*  
*International Patent Application No. PCT/DE98/03543 filed on November 27, 1998*

entitled "CELL-SPECIFIC RETROVIRAL VECTORS WITH ANTIBODY DOMAINS AND METHOD FOR THE PRODUCTION THEREOF FOR SELECTIVE GENE TRANSFER"

Applicant: *Bundesrepublik Deutschland, letztvertreten durch den Präsidenten des Paul-Ehrlich-Instituts*

Dated: May 25, 2000

Signature:

*Sabine Riemann*

Our Reference: 158-2US

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## SEQUENCE LISTING

## (1) GENERAL INFORMATION:

## (i) APPLICANT:

- (A) NAME: Federal Republic of Germany, finally represented by  
the President of the Paul-Ehrlich-Institute  
(B) STREET: Paul-Ehrlich-Str. 51-59  
(C) CITY: Langen  
(E) COUNTRY: Germany  
(F) POSTAL CODE (ZIP): 63225

(ii) TITLE OF INVENTION: CELL-SPECIFIC RETROVIRAL VECTORS WITH  
ANTIBODY DOMAINS AND METHOD FOR THE PRODUCTION THEREOF FOR SELECTIVE GENE  
TRANSFER

(iii) NUMBER OF SEQUENCES: 31

## (iv) COMPUTER-READABLE FORM:

- (A) MEDIUM TYPE: Floppy disk  
(B) COMPUTER: IBM PC compatible  
(C) OPERATING SYSTEM: PC-DOS/MS-DOS  
(D) SOFTWARE: PatentIn Release #1.0, Version #1.30 (EPA)

## (v) PRIOR APPLICATION DATA:

APPLICATION NUMBER: DE 197 52 854.6  
DATE OF APPLICATION: 28-11-1997

## (2) INFORMATION FOR SEQ ID NO: 1:

## (i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 4776 Base pairs  
(B) TYPE: Nucleotide  
(C) STRANDEDNESS: double  
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: other nucleic acid

(iii) HYPOTHETICAL: NO

## (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 1:

GAATTC	CCCGT	ACGAGC	CATA	GATAAA	AATAA	AAGATT	TTTAT	TTAGT	CTCCA	GAAAA	AGGGG	60
GGAAT	GAAAG	ACCCAC	CCTG	TAGGTT	TGGC	AAGCT	AGCTT	AAGTA	ACGCC	ATTTT	GCAAG	120
GCATG	GAAAA	ATACAT	AACT	GAGAAT	AGAG	AAGTTC	AGAT	CAAGGT	CAGG	AACAG	ATGGA	180
ACAGCT	GAAT	ATGGG	CCAAA	CAGGAT	ATCT	GTGGA	AAGCA	GTTCC	TGCCC	CGGCT	CAGGG	240
CCAAGA	ACAG	ATGGA	ACAGC	TGAAT	ATGGG	CCAAAC	AGGA	TATCT	GTGGT	AAGCA	GTTC	300
TGCCCC	GGCT	CAGGG	CCAAG	AACAG	ATGGT	CCCCA	GATGC	GGTCC	AGCCC	TCAGC	AGTTT	360
CTAGAG	AACC	ATCAG	ATGTT	TCCAG	GGTGC	CCCAAG	GACC	TGAAA	TGACC	CTGTG	CCCTTA	420
TTTGA	ACTAA	CCAAT	CAGTT	CGCTT	CTCGC	TTCTG	TTCGC	GCGCT	TCTGC	TCCCC	GAGCT	480
CAATAA	AAGA	GCCCAC	AACC	CCTCA	CTCGG	GGCGC	CAGTC	CTCCG	ATTGA	CTGAG	TCGCC	540
CGGCT	G	G	G	G	G	AGCTC	GCTGT	TGGG	CTCGC	GTTG	AGGACA	600
AACTC	TT	CGC	GGT	CTT	TCCA							

GTACTCTTGG ATCGGAAACC CGTCGGCCTC CGAACGGTAC TCCGCCACCG AGGGACCTGA 660  
GCGAGTCCGC ATCGACCGGA TCGGAAACC TCTCGAGAAA GGCGTCTAAC CAGTCACAGT 720  
CGCAAGGTAG GCTGAGCACC GTGGCCGGGC GGCACGGGTG GCGGTCGGGG TTGTTTCTGG 780  
CGGAGGTGCT GCTGATGATG TAATTAAGTA GGCGGTCTTG AGACGGCGAT GGTGAGGTG 840  
AGGTGTGGCA GGCTTGAGAT CTGGCCATAC ACTTGAGTGA CAATGACATC CACTTTGCCT 900  
TTCTCTCCAC AGGTGTCCAC TCCCAGGTCC AACC GGATCC GAGCTCCACC GCGGTAAAGG 960  
TCGCTGGGAA GACCCCGTGG ATCCACCACT CTCGACTCAA GAAAGCTCCT GACAACCAAG 1020  
AAGAATGGAC TGTCTCACCA ACCTCCGATC CGCTGAGGGT AAAGTTGACC AGGCGAGCAA 1080  
AATCCTAATT CTCCTTGTGG CTTGGTGGGG GTTTGGGACC ACTGCCGAAG TTTGACTGTC 1140  
CGGCTCCGGG GCGGGTGGTT CTGGTGGTGG TTCTGGTGGT GGTGGTTCTG GTGGTGGTGG 1200  
TTCTGGCGCC AGCCAGTCC AGTTTATCCC CCTGCTTGTG GGTCTAGGGA TTTCAGGGGC 1260  
TACACTTGCT GGTGGAACGG GGCTTGGGGT CTCCGTTTAC ACTTATCACA AGCTCTCTAA 1320  
TCAATTGATT GAAGATGTCC AGGCTCTTTC AGGGACCATC AATGACCTAC AGGACCAGAT 1380  
TGACTCCCTG GCTGAGGTTG TCTTACAAA TAGAAGAGGG TTAGACCTAT TGACTGCCGA 1440  
ACAAGGAGGA ATATGTCTCG CACTCCAGGA GAAGTGTGT TTTTACGCTA ACAAGTCGGG 1500  
TATCGTACGT GACAAGATCC GAAACTCCA AGAGGACCTT ATCGAGAGAA AACGTGCACT 1560  
GTACGACAAC CCCCTGTGGA GCGGCTTGAA CGGCTTCCTT CCATATTTGC TACCCTTGTT 1620  
AGGCCCCCTG TTTGGGCTCA TATTGTTCTT GACCTCGGC CCGTGCATTA TGAAGACCTT 1680  
GACTCGCATT ATACATGACA AAATTCAGGC AGTAAATCC TAGCACTAGT CCCACAGTAC 1740  
AAGCCACTCC CAACAGAGAT GGATACCCTA GGGGTCCGAT GGTCTAAGAA TTCTCGAGTC 1800  
TAAGATCGAT CGAATTCCTA GGTCAATGAT TTGACCAGAA TGTACAAGAG CAGTGGGGAA 1860  
TGTGGGAGGG GCTTACGAAG GCCTTAAGTG ACTAGGTACC CGATCCAGAC ATGATAAGAT 1920  
ACATTGATGA GTTTGGACAA ACCACAATA GAATGCAGTG AAAAAATGC TTTATTTGTG 1980  
AAATTTGTGA TGCTATFGCT TTATTTGTAA CCATTATAAG CTGCAATAAA CAAGTTAACA 2040  
ACAACAATTG CATTCATTTT ATGTTTCAGG TTCAGGGGGA GGTGTGGGAG GTTTTTTAAA 2100  
GCAAGTAAAA CCTCTACAAA TCAAGCTGGG CAAGCTAGAT CTAGCTTGGC GTAATCATGG 2160  
TCATAGCTGT TTCCTGTGTG AAATGTTAT CCGCTCACA TTCCACACAA CATACGAGCC 2220  
GGAAGCATAA AGTGTAAGC CTGGGGTGCC TAATGAGTGA GCTAACTCAC ATTAATTGCG 2280  
TTGCGCTCAC TGCCCGCTTT CCAGTCGGGA AACCTGTCGT GCCAGCTGCA TTAATGAATC 2340  
GGCCAACGCG CGGGGAGAGG CGGTTTGCCT ATTGGGCGCT CTTCCGCTTC CTCGCTCACT 2400  
GACTCGCTGC GCTCGGTGCT TCGGCTGCGG CGAGCGGTAT CAGCTCACTC AAAGGCGGTA 2460  
ATACGGTTAT CCACAGAATC AGGGGATAAC GCAGGAAAGA ACATGTGAGC AAAAGGCCAG 2520  
CAAAAGGCCA GGAACCGTAA AAAGGCCGCG TTGCTGGCGT TTTTCCATAG GCTCCGCCCC 2580

CCTGACGAGC ATCACAAAAA TCGACGCTCA AGTCAGAGGT GGCGAAACCC GACAGGACTA	2640
TAAAGATACC AGGCGTTTCC CCCTGGAAGC TCCCTCGTGC GCTCTCCTGT TCCGACCCTG	2700
CCGCTTACCG GATACCTGTC CGCCTTTCTC CTTTCGGGAA GCGTGGCGCT TTCTCAATGC	2760
TCACGCTGTA GGTATCTCAG TTCGGTGTAG GTCGTTGCT CCAAGCTGGG CTGTGTGCAC	2820
GAACCCCCCG TTCAGCCCGA CCGCTGCGCC TTATCCGGTA ACTATCGTCT TGAGTCCAAC	2880
CCGGTAAGAC ACGACTTATC GCCACTGGCA GCAGCCACTG GTAACAGGAT TAGCAGAGCG	2940
AGGTATGTAG GCGGTGCTAC AGAGTTCTTG AAGTGGTGGC CTAACACGG CTACACTAGA	3000
AGGACAGTAT TTGGTATCTG CGCTCTGCTG AAGCCAGTTA CCTTCGGAAA AAGAGTTGGT	3060
AGCTCTTGAT CCGGCAAACA AACCACCGCT GGTAGCGGTG GTTTTTTTGT TTGCAAGCAG	3120
CAGATTACGC GCAGAAAAAA AGGATCTCAA GAAGATCCTT TGATCTTTTC TACGGGGTCT	3180
GACGCTCAGT GGAACGAAAA CTCACGTAA GGGATTTTGG TCATGAGATT ATCAAAAAGG	3240
ATCTTCACCT AGATCCTTTT AAATTAAAAA TGAAGTTTTA AATCAATCTA AAGTATATAT	3300
GAGTAACTT GGTCTGACAG TTACCAATGC TTAATCAGTG AGGCACCTAT CTCAGCGATC	3360
TGTCTATTTT GTTCATCCAT AGTTGCCTGA CTCCCCGTCG TGTAGATAAC TACGATACGG	3420
GAGGGCTTAC CATCTGGCCC CAGTGCTGCA ATGATACCGC GAGACCCACG CTCACCGGCT	3480
CCAGATTTAT CAGCAATAAA CCAGCCAGCC GGAAGGGCCG AGCGCAGAAG TGGTCCTGCA	3540
ACTTTATCCG CCTCCATCCA GTCTATTAAT TGTGCGCGG AAGCTAGAGT AAGTAGTTCG	3600
CCAGTTAATA GTTTGCGCAA CGTTGTTGCC ATTGCTACAG GCATCGTGGT GTCACGCTCG	3660
TCGTTTGGA TGGCTTCATT CAGCTCCGGT TCCCAACGAT CAAGGCGAGT TACATGATCC	3720
CCCATGTTGT GCAAAAAAGC GGTTAGCTCC TTCGGTCCTC CGATCGTTGT CAGAAGTAAG	3780
TTGGCCGCGAG TGTTATCACT CATGGTTATG GCAGCACTGC ATAATTCTCT TACTGTCTATG	3840
CCATCCGTAA GATGCTTTTC TGTGACTGGT GAGTACTCAA CCAAGTCATT CTGAGAATAG	3900
TGTATGCGGC GACCGAGTTG CTCTTGCCCC GCGTCAATAC GGGATAATAC CGCGCCACAT	3960
AGCAGAACTT TAAAAGTGCT CATCATTGGA AAACGTTCTT CGGGGCGAAA ACTCTCAAGG	4020
ATCTTACCGC TGTTGAGATC CAGTTCGATG TAACCCACTC GTGCACCCAA CTGATCTTCA	4080
GCATCTTTTA CTTTCACCAG CGTTTCTGGG TGAGCAAAAA CAGGAAGGCA AAATGCCGCA	4140
AAAAAGGGAA TAAGGGCGAC ACGGAAATGT TGAATACTCA TACTCTTCCT TTTTCAATAT	4200
TATTGAAGCA TTTATCAGGG TTATTGTCTC ATGAGCGGAT ACATATTTGA ATGTATTTAG	4260
AAAAATAAAC AAATAGGGGT TCCGCGCACA TTTCCCCGAA AAGTGCCACC TGACGTCTAA	4320
GAAACCATTA TTATCATGAC ATTAACCTAT AAAAATAGGC GTATCACGAG GCCCTTTCGT	4380
CTCGCGCGTT TCGGTGATGA CGGTGAAAAC CTCTGACACA TGCAGCTCCC GGAGACGGTC	4440
ACAGCTTGTC TGTAAGCGGA TGCCGGGAGC AGACAAGCCC GTCAGGGCGC GTCAGCGGGT	4500

GTGGCGGGT	GTGGGGCTG	GCTTAACAT	GCGGCATCAG	AGCAGATTGT	ACTGAGAGTG	4560
CACCATATGC	GGTGTGAAAT	ACCGCACAGA	TGCGTAAGGA	GAAATACCG	CATCAGGCGC	4620
CATTGCGCCAT	TCAGGCTGCG	CAACTGTTGG	GAAGGGCGAT	CGGTGCGGGC	CTCTTCGCTA	4680
TTACGCCAGC	TGGCGAAAGG	GGGATGTGCT	GCAAGGCGAT	TAAGTTGGGT	AACGCCAGGG	4740
TTTCCCAGT	CACGACGTTG	TAAAACGACG	GCCAGT			4776

(2) INFORMATION FOR SEQ ID NO: 2:

- (i) SEQUENCE CHARACTERISTICS;  
 (A) LENGTH: 12 Amino acids  
 (B) TYPE: Amino acid  
 (D) TOPOLOGY: linear  
 (ii) MOLECULE TYPE: Protein  
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 2;

Met Lys Asp Pro Thr Cys Arg Phe Gly Lys Leu Ala  
5 10

(2) INFORMATION FOR SEQ ID NO: 3:

- (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 21 Amino acids  
 (B) TYPE: Amino acid  
 (D) TOPOLOGY: linear  
 (ii) MOLECULE TYPE: Protein  
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 3:

Met Glu Lys Tyr Ile Thr Glu Asn Arg Glu Val Gln Ile Lys Val Arg  
5 10 15

Asn Arg Trp Asn Ser  
20

(2) INFORMATION FOR SEQ ID NO: 4:

- (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 8 Amino acids  
 (B) TYPE: Amino acid  
 (D) TOPOLOGY: linear  
 (ii) MOLECULE TYPE: Protein  
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 4:  
 Met Gly Gln Thr Gly Tyr Leu Trp

Met Gly Gln Thr Gly Tyr Leu Trp  
5

(2) INFORMATION FOR SEQ ID NO: 5:

- (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 13 Amino acids  
 (B) TYPE: Amino acid  
 (D) TOPOLOGY: linear  
 (ii) MOLECULE TYPE: Protein  
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 5:  
 Met Glu Gln Leu Asn Met Gly Gln Thr Gly Tyr Leu Trp  
 5 10

Met Glu Gln Leu Asn Met Gly Gln Thr Gly Tyr Leu Trp  
5 10

(2) INFORMATION FOR SEQ ID NO: 6:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 12 Amino acids  
(B) TYPE: Amino acid  
(D) TOPOLOGY: linear  
(ii) MOLECULE TYPE: Protein  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 6:

- (2) INFORMATION FOR SEQ ID NO: 7:  
 (i) SEQUENCE CHARACTERISTICS:  
     (A) LENGTH: 10 Amino acids  
     (B) TYPE: Amino acid  
     (D) TOPOLOGY: linear  
 (ii) MOLECULE TYPE: Protein  
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 7:  
 Met Phe Pro Gly Cys Pro Lys Asp Leu Lys  
                 5                                10

- (2) INFORMATION FOR SEQ ID NO: 8:  
(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 15 Amino acids  
(B) TYPE: Amino acid  
(D) TOPOLOGY: linear  
(ii) MOLECULE TYPE: Protein  
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 8:
- Met Val Glu Val Arg Cys Gly Arg Leu Glu Ile Trp Pro Tyr Thr  
                5  10  15

- (2) INFORMATION FOR SEQ ID NO: 9:  
 (i) SEQUENCE CHARACTERISTICS:  
     (A) LENGTH: 24 Amino acids  
     (B) TYPE: Amino acid  
     (D) TOPOLOGY: linear  
 (ii) MOLECULE TYPE: Protein  
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 9:
- Met Thr Ser Thr Leu Pro Phe Ser     Pro Gln Val Ser Thr Pro Arg Ser
- 510
- Asn Arg Ile Arg Ala Pro Pro Arg
- 2015

- (2) INFORMATION FOR SEQ ID NO: 10:  
 (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 232 Amino acids  
 (B) TYPE: Amino acid  
 (D) TOPOLOGY: linear  
 (ii) MOLECULE TYPE: Protein  
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 10:

Met	Asp	Cys	Leu	Thr	Asn	Leu	Arg	Ser	Ala	Glu	Gly	Lys	Val	Asp	Gln
				5					10					15	
Ala	Ser	Lys	Ile	Leu	Ile	Leu	Leu	Val	Ala	Trp	Trp	Gly	Phe	Gly	Thr
			20					25					30		
Thr	Ala	Glu	Val	Ser	Thr	Ala	Gly	Ser	Gly	Gly	Gly	Gly	Ser	Gly	Gly
		35					40					45			
Gly	Ser	Gly	Gly	Gly	Gly	Ser	Gly	Gly	Gly	Gly	Ser	Gly	Ala	Ser	Pro
	50				55					60					
Val	Gln	Phe	Ile	Pro	Leu	Leu	Val	Gly	Leu	Gly	Ile	Ser	Gly	Ala	Thr
65					70					75					80
Leu	Ala	Gly	Gly	Thr	Gly	Leu	Gly	Val	Ser	Val	His	Thr	Tyr	His	Lys
				85				90						95	
Leu	Ser	Asn	Gln	Leu	Ile	Glu	Asp	Val	Gln	Ala	Leu	Ser	Gly	Thr	Ile
			100					105					110		
Asn	Asp	Leu	Gln	Asp	Gln	Ile	Asp	Ser	Leu	Ala	Glu	Val	Val	Leu	Gln
		115					120					125			
Asn	Arg	Arg	Gly	Leu	Asp	Leu	Leu	Thr	Ala	Glu	Gln	Gly	Gly	Ile	Cys
130					135					140					
Leu	Ala	Leu	Gln	Glu	Lys	Cys	Cys	Phe	Tyr	Ala	Asn	Lys	Ser	Gly	Ile
145					150					155					160
Val	Arg	Asp	Lys	Ile	Arg	Lys	Leu	Gln	Glu	Asp	Leu	Ile	Glu	Arg	Lys

6

				165					170					175					
Arg	Ala	Leu	Tyr	Asp	Asn	Pro	Leu	Trp	Ser	Gly	Leu	Asn	Gly	Phe	Leu				
			180					185					190						
Pro	Tyr	Leu	Leu	Pro	Leu	Leu	Gly	Pro	Leu	Phe	Gly	Leu	Ile	Leu	Phe				
		195					200					205							
Leu	Thr	Leu	Gly	Pro	Cys	Ile	Met	Lys	Thr	Leu	Thr	Arg	Ile	Ile	His				
		210				215					220								
Asp	Lys	Ile	Gln	Ala	Val	Lys	Ser												
225					230														

## (2) INFORMATION FOR SEQ ID NO: 11:

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 14 Amino acids

(B) TYPE: Amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 11:

Met	Asp	Thr	Leu	Gly	Val	Arg	Trp	Ser	Lys	Asn	Ser	Arg	Val
			5						10				

## (2) INFORMATION FOR SEQ ID NO: 12:

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 15 Amino acids

(B) TYPE: Amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 12:

Met	Tyr	Lys	Ser	Ser	Gly	Glu	Cys	Gly	Arg	Gly	Leu	Arg	Arg	Pro
			5						10					15

## (2) INFORMATION FOR SEQ ID NO: 13:

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 16 Amino acids

(B) TYPE: Amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 13:

Met	Ile	Arg	Tyr	Ile	Asp	Glu	Phe	Gly	Gln	Thr	Thr	Thr	Arg	Met	Gln
			5						10						15

## (2) INFORMATION FOR SEQ ID NO: 14:

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 4 Amino acids

(B) TYPE: Amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 14:

Met Leu Tyr Leu

## (2) INFORMATION FOR SEQ ID NO: 15:

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 6 Amino acids

(B) TYPE: Amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 15:

Met	Leu	Leu	Leu	Tyr	Leu
			5		

## (2) INFORMATION FOR SEQ ID NO: 16:

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 12 Amino acids

(B) TYPE: Amino acid

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(D) TOPOLOGY: linear  
 (ii) MOLECULE TYPE: Protein  
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 16:  
 Met Phe Gln Val Gln Gly Glu Val Trp Glu Val Phe  
                   5                  10

(2) INFORMATION FOR SEQ ID NO: 17:  
 (i) SEQUENCE CHARACTERISTICS:  
   (A) LENGTH: 26 Amino acids  
   (B) TYPE: Amino acid  
   (D) TOPOLOGY: linear  
 (ii) MOLECULE TYPE: Protein  
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 17:

Met Val Ile Ala Val Ser Cys Val Lys Leu Leu Ser Ala His Asn Ser  
                   5                  10                  15  
 Thr Gln His Thr Ser Arg Lys His Lys Val  
                   20                  25

(2) INFORMATION FOR SEQ ID NO: 18:  
 (i) SEQUENCE CHARACTERISTICS:  
   (A) LENGTH: 49 Amino acids  
   (B) TYPE: Amino acid  
   (D) TOPOLOGY: linear  
 (ii) MOLECULE TYPE: Protein  
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 18:

Met Ser Glu Leu Thr His Ile Asn Cys Val Ala Leu Thr Ala Arg Phe  
                   5                  10                  15  
 Pro Val Gly Lys Pro Val Val Pro Ala Ala Leu Met Asn Arg Pro Thr  
                   20                  25                  30  
 Arg Gly Glu Arg Arg Phe Ala Tyr Trp Ala Leu Phe Arg Phe Leu Ala  
                   35                  40                  45  
 His

(2) INFORMATION FOR SEQ ID NO: 19:  
 (i) SEQUENCE CHARACTERISTICS:  
   (A) LENGTH: 4 Amino acids  
   (B) TYPE: Amino acid  
   (D) TOPOLOGY: linear  
 (ii) MOLECULE TYPE: Protein  
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 19:

Met Leu Thr Leu

(2) INFORMATION FOR SEQ ID NO: 20:  
 (i) SEQUENCE CHARACTERISTICS:  
   (A) LENGTH: 9 Amino acids  
   (B) TYPE: Amino acid  
   (D) TOPOLOGY: linear  
 (ii) MOLECULE TYPE: Protein  
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 20:  
 Met Arg Leu Ser Lys Arg Ile Phe Thr  
                   5

(2) INFORMATION FOR SEQ ID NO: 21:  
 (i) SEQUENCE CHARACTERISTICS:  
   (A) LENGTH: 11 Amino acids  
   (B) TYPE: Amino acid  
   (D) TOPOLOGY: linear  
 (ii) MOLECULE TYPE: Protein  
 (xi) SEQUENCE DESCRIPTION: SEQ ID NO: 21:  
 Met Ser Lys Leu Gly Leu Thr Val Thr Asn Ala  
                   5                  10



## (2) INFORMATION FOR SEQ ID NO: 22:

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 70 Amino acids

(B) TYPE: Amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 22:

```

Met Arg Cys Glu Ile Pro His Arg Cys Val Arg Arg Lys Tyr Arg Ile
      5              10              15
Arg Arg His Ser Pro Phe Arg Leu Arg Asn Cys Trp Glu Gly Arg Ser
      20              25              30
Val Arg Ala Ser Ser Leu Leu Arg Gln Leu Ala Lys Gly Gly Cys Ala
      35              40              45
Ala Arg Arg Leu Ser Trp Val Thr Pro Gly Phe Ser Gln Ser Arg Arg
      50              55              60
Cys Lys Thr Thr Ala Ser
      65              70

```

## (2) INFORMATION FOR SEQ ID NO: 23:

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 88 Amino acids

(B) TYPE: Amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 23:

```

Met Ile Pro Arg Asp Pro Arg Ser Pro Ala Pro Asp Leu Ser Ala Ile
      5              10              15
Asn Gln Pro Ala Gly Arg Ala Glu Arg Ser Gly Pro Ala Thr Leu
      20              25              30
Ser Ala Ser Ile Gln Ser Ile Asn Cys Cys Arg Glu Ala Arg Val Ser
      35              40              45
Ser Ser Pro Val Asn Ser Leu Arg Asn Val Val Ala Ile Ala Thr Gly
      50              55              60
Ile Val Val Ser Arg Ser Ser Phe Gly Met Ala Ser Phe Ser Ser Gly
      65              70              75              80
Ser Gln Arg Ser Arg Arg Val Thr
      85

```

## (2) INFORMATION FOR SEQ ID NO: 24:

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 56 Amino acids

(B) TYPE: Amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 24:

```

Met Leu Cys Lys Lys Ala Val Ser Ser Phe Gly Pro Pro Ile Val Val
      5              10              15
Arg Ser Lys Leu Ala Ala Val Leu Ser Leu Met Val Met Ala Ala Leu
      20              25              30
His Asn Ser Leu Thr Val Met Pro Ser Val Arg Cys Phe Ser Val Thr
      35              40              45
Gly Glu Tyr Ser Thr Lys Ser Phe
      50              55

```

## (2) INFORMATION FOR SEQ ID NO: 25:

## (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 49 Amino acids

(B) TYPE: Amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 25:

Met	Arg	Arg	Pro	Ser <sub>5</sub>	Cys	Ser	Cys	Pro	Ala <sub>10</sub>	Ser	Ile	Arg	Asp	Asn	Thr
Ala	Pro	His	Ser <sub>20</sub>	Arg	Thr	Leu	Lys	Val <sub>25</sub>	Leu	Ile	Ile	Gly	Lys <sub>30</sub>	Arg	Ser
Ser	Gly	Arg <sub>35</sub>	Lys	Leu	Ser	Arg	Ile <sub>40</sub>	Leu	Pro	Leu	Leu	Arg <sub>45</sub>	Ser	Ser	Ser

(2) INFORMATION FOR SEQ ID NO: 26:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 6 Amino acids

(B) TYPE: Amino acid

(D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: Protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 26:  
Pro Gln Lys Leu Arg Cys

Met Pro Gln Lys Arg Glu  
5

(2) INFORMATION FOR SEQ ID NO: 27:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 27 Amino acids

(B) TYPE: Amino acid

(D) TOPOLOGY: linear

(11) MOLECULE TYPE: Protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 27:

Met Leu Asn Thr His Thr Leu Pro Phe Ser Ile Leu Leu Lys His Leu  
5  
Ser Gly Leu Leu Ser His Glu Arg Ile His Ile  
10  
20 25 15

(2) INFORMATION FOR SEQ ID NO: 28:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 5 Amino acids

(B) TYPE: Amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 28:

Met Tyr Leu Glu Lys  
5

(2) INFORMATION FOR SEQ ID NO: 29:

(1) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 26 Amino acids

(B) TYPE: Amino acid

(D) TOPOLOGY: linear

## (ii) MOLECULE TYPE: Protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 29:

Met Thr Leu Thr Tyr Lys Asn Arg Arg Ile Thr Arg Pro Phe Arg Leu  
5 10  
Ala Arg Phe Gly Asp Asp Gly Glu Asn Leu  
20 25 15

(2) INFORMATION FOR SEQ ID NO: 30:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 11 Amino acids

(B) TYPE: Amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 30:

10

Met Gln Leu Pro Glu Thr Val Thr Ala Cys Leu  
5 10

(2) INFORMATION FOR SEQ ID NO: 31:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 31 Amino acids

(B) TYPE: Amino acid

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Protein

(x1) SEQUENCE DESCRIPTION: SEQ ID NO: 31:

Met Pro Gly Ala Asp Lys Pro Val Arg Ala Arg Gln Arg Val Leu Ala  
5 10 15  
Gly Val Gly Ala Gly Leu Thr Met Arg His Gln Ser Arg Leu Tyr  
20 25 30